

## **ABSTRACT**

A spectroscopy system is provided which operates in the vacuum ultra-violet spectrum. More particularly, a system utilizing reflectometry techniques in the vacuum ultraviolet spectrum is provided for use in metrology applications. The system may further include the use of an array detector in combination with an imaging spectrometer. In this manner data for multiple wavelengths may be simultaneously collected. Moreover, the multiple wavelengths of data may be collected simultaneously for a two dimensional sample area. The system may further include the use of a fixed diffraction grating and does not require the use of polarizing elements. To ensure accurate and repeatable measurement, the environment of the optical path is controlled. The optical path may include a controlled environmental chamber in which non-absorbing purge gases are present or in which vacuum evacuation techniques are utilized. The controlled environment may further include a separate instrument chamber and a separate sample chamber. The controlled environment limits in a repeatable manner the absorption of VUV photons.